Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2171005 **Date: 02/05/2017**

Subject Name: Embedded Systems

Time: 02.30 PM to 05.00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Describe various processor architectures and their applications in several domains of embedded system design.	**07**
	(b)	Explain the requirements of Software Interrupts (SWI) in software part of an Embedded System.	**07**
Q.2	**(a)**	What is a device driver? What are its requirements? Describe the information required for writing a device driver.	**07**
	(b)	Describe the features associated with several ARM Buses.	**07**
		OR	
	(b)	Describe the features associated with Bluetooth and Zigbee protocols. Discuss the application areas for both the protocols.	**07**
Q.3	**(a)**	State the differences between a Task, a Function and an Interrupt Service Routine.	**07**
	(b)	What is Multithreading? Explain the concept of Multithreading in Real Time Operating System with the help of an application.	**07**
		OR	
Q.3	**(a)**	What is Semaphore? Explain where Semaphore can be utilized? Describe the functions provided by RTOS to utilize it.	**07**
	(b)	What is the significance of Mailbox in RTOS? Describe the functions provided by RTOS in association with Mailbox.	**07**
Q.4	**(a)**	Describe the characteristics associated with Earliest Deadline First Scheduler stating its merits and demerits.	**07**
	(b)	Explain the Process Management in RTOS along with describing the role of a Timer and Task Control Block.	**07**
		OR	
Q.4	**(a)**	Describe Memory management services provided by RTOS.	**07**
	(b)	How can an interrupt be served in an RTOS environment where the interrupt is to be first handled by the RTOS?	**07**
Q.5	**(a)**	Explain a Timer module of MSP430 with various modes of operation associated with it.	**07**
	(b)	It is required to accept an incoming signal on GPIO pin P1.0 as an interrupt. Write a 'C' program utilizing an interrupt service routine to count number of rising edges on Port pin P1.0.	**07**
		OR	
Q.5	**(a)**	Answer the following questions regarding MSP430 processor. (i) Describe the clock system of MSP430 processor. (ii) Explain the multiplexing scheme in MSP430 processor for the port pins.	**07**

(b) It is required to interface three seven segment LED modules with an MSP430 processor. Draw the interfacing for it and write a ‘C’ program utilizing timer for refreshing the seven segment LEDs at a rate of 1 KHz to display a three digit value ‘178’ stored in a variable ‘x’. **07**

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